CLAIMS

1. A system for therapy and diagnosis of a human or animal comprising at least one first radiation source for emission of radiation, and at least one first radiation conductor adapted to conduct radiation to a tumor site at or in said human or animal, wherein the radiation conductor is in use employed as a transmitter and/or a receiver for conduction of radiation to and/or from the tumour site for therapy and diagnosis of a tumour at the tumour site, **characterised** by at least one distributor adapted to distribute said radiation from at least the first radiation source to the tumour site, wherein the distributor comprises at least one longitudinal translatory element being arranged in such a manner that radiation is coupled in different constellations for different operating modes of said system by longitudinal translatory movement of said longitudinal translatory element between pre-determined positions, wherein said radiation is non-ionising electromagnetical radiation.

2. The system according to claim 1, wherein said first radiation is diagnostic radiation, and the system comprising at least one second radiation source for emission of a therapeutic radiation through at least one of said radiation conductors to said site.

3. The system according to claim 1 or 2, said tumour therapy and diagnosis being interactive interstitial photodynamic tumour therapy and/or photothermal tumour therapy and/or tumour diagnosis.

4. The system according to any of the preceding claims, **characterised** by

a plurality of first radiation conductors arranged for conducting radiation to and from the tumour site,

a plurality of second radiation conductors arranged for delivering radiation from at least one radiation source and/or conduction of radiation to at least one radiation sensor, and

wherein said distributor is a distributor for distribution of radiation from at least one radiation source to the tumour site and/or from the tumour site to at least one radiation sensor, wherein the distributor comprises at least two translatory elements being arranged in such a manner that radiation is coupled in different constellations by translatory movement of a first of said element between pre-determined positions relative to a second of said members.

5. The system according to claim 4, **characterised** in that each element has holes arranged for receiving said radiation conductors and that corresponding holes on the two elements are equidistantly arranged on a straight line.

6. The system according to claim 5, **characterised** in that first ends of the first radiation conductors are fixed in the holes of a translatory displacement element and first ends of second radiation conductors are fixed in the holes in the other element, wherein the first and the second radiation conductors are connectable to each other

in different constellations through said longitudinal translatory movement between pre-determined positions of the longitudinal translatory displacement element and the other element relative each other.

7. The system according to claim 6, **characterised** in that said other element is a second longitudinal translatory displacement element.

8. The system according to claim 1 or 5, **characterised** by further comprising two flat discs in close proximity to each other, wherein said discs are turnable relatively to each other,

each disc having holes arranged on a circular line, wherein the circle radius on one disc equals the circle radius on the other disc and where the holes in one disc are equally distributed on the circle line with an angular separation of $v_1=(360/n_1)$ degrees, n_1 being the number of holes, and the holes in the other disc are equally distributed on the circle line with an angular separation of $v_2=(360/n_2)$ degrees, wherein $n_2 = m \times n_1$, and wherein m is a multiple, which yields n_2 as an integer ≥ 1, and

wherein first ends of said third radiation conductors are fixed in the holes of the first disc and first ends of fourth radiation conductors are fixed in all holes of the second disc except for one, whereby the third and the fourth radiation conductors by rotation of the turnable disc relative to each other are connectable to each other in different constellations,

and wherein said longitudinal translatory element is arranged substantially radially outwards movable and integrated with said other disc to couple between a plurality of said first radiation conductors to one of said third radiation conductors.

9. The system according to claim 8, **characterised** by n_1 being the number of holes in the first disc of the distributor, $n_1 = 6$ and $m = 2$, yielding $n_2 = 12$ holes in the second disc of the distributor.

10. The system according to claim 8 or 9, **characterised** by every other fourth radiation conductor being part of a first series of fourth radiation conductors and that an radiation conductor in said first series of fourth radiation conductors being arranged for emitting radiation from the radiation source and the other radiation conductors in said first series of fourth radiation conductors being arranged for conduction of radiation to the radiation sensor.

11. The system according to any of claims 8 to 9, **characterised** in said first radiation conductors being connected to diagnostic radiation sources, such that the longitudinal translatory element in said other disc couples one of said diagnostic radiation sources to one of said third radiation conductors in said first disc.

12. The system according to any of claims 1 to 11, **characterised** by the diagnostic radiation source being

a light source for near-infrared (NIR), white, red, blue/violet and/or ultraviolet light.

13. The system according to any of claims 1 to 12, **characterised** by the diagnostic radiation source comprising a beamsplitter.

14. The system according to claim13, **characterised** by a transferring radiation conductor being arranged between a dichroic beamsplitter and the radiation sensor.

15. The system according to claim 12, **characterised** by the third radiation conductors second ends being treated by a material with temperature sensitive fluorescence emission.

16. The system according to claims 8 or 9, **characterised** by every second of said fourth radiation conductors being part of a second series of fourth radiation conductors arranged for emission of radiation from the radiation source.

17. The system according to claims 2 to16, **characterised** by the therapeutic radiation source being a light source for coherent light of a single fixed wavelength.

18. A system according to any of claims 1 to 17, **characterised** by the distributor including means for

locking the radiation distributor into pre-determined transversal and/or azimutal positions.

19. A system according to any of the preceding claims, **characterised** by the radiation conductors being optical fibres.

20. The system according to claims 12 to 14, **characterised** by fluorescence being recorded through the same radiation conductor as the one transmitting radiation to the tumour site.

21. The system according to claim 15, **characterised** in that for interactive photodynamic therapy one or several of the radiation conductors which are treated with the material with a temperature sensitive fluorescence emission are in use measuring the temperature at the tumour site,

that the radiation which is sent to the tumour site in use heats the tumour site, and

that the intensity of the radiation is controllable by the measured temperature in order to regulate the temperature of the tumour site at the individual radiation conductors.

22. The system according to any of the preceding claims, **characterised** in that said longitudinal translatory displacement element is an optical sledge.

23. The system according to any of the preceding claims, **characterised** by at least one stepping motor or at

least one servo system for moving said elements of said radiation distributor relative each other.

24. The system according to any of the preceding claims, **characterised** in that said operation modes are modes of the system comprised in the list of: interactive interstitial photodynamic tumour therapy, photothermal tumour therapy using hyperthermia, and tumour diagnostics, whereby these operation modes in use are alternated during the same occasion of treatment of said tumour site.

25. The system according to any of claims 2 to 24, **characterised** by said operation modes of said system comprising

a diagnostic operation mode, wherein one diagnostic radiation source is coupled via a first longitudinal translatory element to said first radiation conductors transmitting diagnostic light to said site and the remaining first radiation conductors are coupled to a radiation detector, and

a therapeutic operation mode, wherein said therapeutic radiation sources are coupled to said first radiation conductors transmitting therapeutic radiation to said site.

26. The system according to claim 25, **characterised** in that at least one second longitudinal translatory element switches between the operating modes.

27. The system according to claim 26, **characterised** in that a third longitudinal translatory

element is configured to switch between a plurality of radiation conductors from said second longitudinal translatory element to said radiation detector.

28. A method for interactive interstitial photodynamic tumour therapy and/or photothermal tumour therapy and/or tumour diagnosis, wherein at least one radiation sensor and radiation conductor is connected to a tumour site and the radiation conductor is used as a transmitter and/or a receiver for conduction of radiation to and/or from a tumour site for diagnosis and therapy of a tumour at the tumour site,

characterised in that the switching between tumour therapy and tumour diagnostics is achieved in an automatised way by switching radiation conductors between different constellations by means of a radiation distibutor comprised in the system according to any of claims 1 to 27, and

that the results from the diagnostics control the therapy process by regulating a therapeutical radiation intensity depending on the results of the diagnostics until an optimal treatment of the tumour site is achieved.

29. The method according to claim 28, **characterised** by alternatingly utilising interactive interstitial photodynamic tumour therapy, photothermal tumour therapy using hyperthermia, and tumour diagnostics during the same occasion of treatment of said tumour site.